We claim:

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1. A measuring device for determining gas flow through a conduit, said device comprising:

a vane arrangement extending into the conduit to be displaceable under the influence of gas flow in the conduit;

a light source arranged to provide a uniform intensity of light over a range of displacement of the vane arrangement;

an optical encoder interposed between the light source and the vane arrangement effective over the range of displacement to encode the light source as a function of displacement under the influence of gas flow; and

a light detector arranged to optically communicate with the encoded light source and provide an output signal based thereupon related to gas flow.

2. The measuring device of claim 1, wherein the vane arrangement is attached to the inner wall of the conduit and forms at least one light guide from the free end thereof to the attached end, and said encoder is interposed between the one or more free ends and the light source so that the encoded light is optically communicated to the one or more light guides by said free ends, and further wherein said light detector optically communicates with the one or more light guides at the attachment end of the vane arrangement.

3. The measuring device of claim 2, wherein the encoder comprises a mask extending of its length over said range of displacement, said mask being configured to transmit a range of light intensities as a function of position along its length.

4. The measuring device of claim 3, wherein said mask is tapered of its length.

5. The measuring device of claim 4, wherein said mask has a double taper to form an arrowhead shaped aperture.

6. The measuring device of claim 2, wherein said vane arrangement has two light guides, and said encoder comprises two rows of regularly spaced discrete light

sources aligned with the free end of the respective light guide, and further wherein said light detector provides two output signals, one for each respective light guide.

7. The measuring device of claim 6, wherein said discrete light sources are formed by slots made in an opaque material covering a sheet of light transmission material.

8. The measuring device of claim 1, wherein said vane has a smaller gas impinging dimension in a portion proximate the attachment end than at the free end.

9. The measuring device of claim 1, wherein the vane arrangement carries a first polarizing element, and said first polarizing element and a second, fixed polarizing element form the encoder, and further wherein said light source, said first and second polarizing elements and said light detector are in optical alignment, the planes of polarization of the respective first and second polarizing elements interacting as a function of displacement of said vane element to result in a range of optical transmitivities.

10. The measuring device of claim 9, wherein said first polarizing element is arcuately shaped.

11. The measuring device of claim 9, wherein said vane arrangement is formed as: (i) a pivoting shaft to which is attached said first polarizing sheet, and (ii) a distally located vane element.

12. The measuring device of claim 11, wherein said first polarizing element is arcuately shaped.

13. CPAP or assisted ventilation apparatus comprising:

a blower to produce pressurised breathable gas;

a gas supply conduit to receive said breathable gas;

a device to deliver said gas, received from said conduit, to a patient's airways;

a controller having control over operation of the blower; and

a flow measuring device as claimed in claim 1, and wherein the output gas flow signal thereof is provided to the controller as a control variable therefor.

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14. A measuring device for measuring gas flow through a conduit, said device comprising:

a light guide extending into the conduit from a fixed end thereof and being displaceable under the influence of gas flow in the conduit;

a light source providing a uniform intensity of light over a range of displacement of said light guide;

an optical encoder interposed between the light source and the vane arrangement effective over the range of displacement to encode the light source as a function of displacement of the light guide under the influence of gas flow. the encoded light being optically communicated to the light guide through the free end thereof; and

a light detector arranged to optically communicate with the fixed end of the light guide to receive said encoded light and provide an output signal based thereupon related to gas flow.

15. The measuring device of claim 14, wherein the encoder comprises a mask extending of its length over said range of displacement, said mask being configured to transmit a range of light intensities as a function of position along its length.

16. The measuring device of claim 15, wherein said mask is tapered of its length.

17. The measuring device of claim 16, wherein said mask has a double taper to form an arrowhead shaped aperture.

18. A measuring device for determining gas flow through a conduit, said device comprising two light guides arranged side-by-side and extending into the conduit from fixed ends thereof, and being displaceable under the influence of gas flow in the conduit;

a light source arranged to provide a uniform intensity of light over a range of displacement of the light guides;

an optical encoder having two parallel rows of slots aligned with the respective free ends of the light guides to encode the light source as a function of displacement of the light guides under influence of gas flow; and

a light detector arranged to optically communicate with the fixed ends of the light guides to receive the encoded light source and provide an output signal based thereupon related to gas flow.

19. The measuring device of claim 18, wherein said rows of slots are formed by an opaque material covering a sheet of light transmission material.

20. A measuring device for measuring gas flow through a conduit, said device comprising:

a vane arrangement extending into the conduit from a fixed end thereof and being displaceable under the influence of gas flow in the conduits;

a light source arranged to provide a uniform intensity of light over a range of displacement of the vane arrangement;

a first polarizing element, carried by the vane arrangement, and a second polarizing element interposed between said first polarizing element and said light source, all in optical alignment, said first and second polarizing elements forming an optical encoder by the planes of polarization of the respective polarizing elements interacting as a function of displacement of said vane element to result in variable optical transmitivity; and

a light detector arranged to receive the encoded light source and to provide an output signal based thereupon related to gas flow.

21. The measuring device of claim 20, wherein said vane arrangement is formed as: (i) a pivoting shaft to which is attached said first polarizing sheet, and (ii) a distally located vane element.

22. The measuring device of claim 21, wherein said first polarizing element is arcuately shaped.

23. CPAP or assisted ventilation apparatus comprising:

a blower to produce pressurised breathable gas;

a gas supply conduit to receive said breathable gas;

a device to deliver said gas, received from said conduit, to a patient's airways;

a controller having control over operation of the blower; and

a flow measuring device comprising:

a light guide extending into the conduit from a fixed end thereof and being displaceable under the influence of gas flow in the conduit;

a light source providing a uniform intensity of light over a range of displacement of said light guide;

an optical encoder interposed between the light source and the vane arrangement effective over the range of displacement to encode the light source as a function of displacement of the light guide under the influence of gas flow, the encoded light being optically communicated to the light guide through the free end thereof; and

a light detector arranged to optically communicate with the fixed end of the light guide to receive said encoded light and provide an output signal based thereupon related to gas flow;

and wherein the output gas flow signal is provided to the controller as a control variable therefor.

24. CPAP or assisted ventilation apparatus comprising:

a blower to produce pressurised breathable gas;

a gas supply conduit to receive said breathable gas;

a device to deliver said gas, received from said conduit, to a patient's airways;

a controller having control over operation of the blower; and

a flow measuring device comprising:

two light guides arranged side-by-side and extending into the conduit from fixed ends thereof, and being displaceable under the influence of gas flow in the conduit;

a light source arranged to provide a uniform intensity of light over a range of displacement of the light guides;

an optical encoder having two parallel rows of slots aligned with the respective free ends of the light guides to encode the light source as a function of displacement of the light guides under influence of gas flow; and

a light detector arranged to optically communicate with the fixed ends of the light guides to receive the encoded light source and provide an output signal based thereupon related to gas flow;

and wherein the output gas flow signal is provided to the controller as a control variable therefor.

25. CPAP or assisted ventilation apparatus comprising:

a blower to produce pressurised breathable gas;

a gas supply conduit to receive said breathable gas;

a device to deliver said gas, received from said conduit, to a patient's airways;

a controller having control over operation of the blower; and

a flow measuring device comprising:

a vane arrangement extending into the conduit from a fixed end thereof and being displaceable under the influence of gas flow in the conduits;

a light source arranged to provide a uniform intensity of light over a range of displacement of the vane arrangement;

a first polarizing element, carried by the vane arrangement. and a second polarizing element interposed between said first polarizing element and said light source, all in optical alignment, said first and second polarizing elements forming an optical encoder by the planes of polarization of the respective polarizing elements interacting as a function of displacement of said vane element to result in variable optical transmitivity; and a light detector arranged to receive the encoded light source and to provide an output signal based thereupon related to gas flow;

and wherein the output gas flow signal is provided to the controller as a control variable therefor.

26. A method for detecting gas flow through a conduit, comprising the steps of:

encoding the light source as a function of a displacement of a vane arrangement located within the conduit under the influence of gas flow; and

detecting the encoded light and producing an output signal representative thereof related to gas flow.

27. The method of claim 26, wherein said encoding step includes varying said light intensity linearly with vane displacement.

28. The method of claim 27, wherein maximum light intensity represents maximum flow in one flow direction, and minimum light intensity represents maximum flow in the opposite direction.

29. The method of claim 26, wherein said encoding step includes forming two sets of binary intervals of light and absence of light. said sets forming a binary pair sequence for displacement of said vane from which direction of flow can be determined.

30. The method of claim 29. wherein a binary interval count determines the flow magnitude.

31. The method of claim 26. wherein said encoding steps includes forming a variable optical transmittivity as a function of vane displacement between aligned polarizers.